

Widespread rains fell in most eastern districts during the first few days of the third decade, and shortly after its middle heavy rain fell in Texas and southern Louisiana, while snow occurred in the western portions of Nebraska and South Dakota and in Wyoming and Colorado. This general precipitation area moved over the Plains States and to the eastward—except portions of the Atlantic Coast States—with rather large falls in parts of the Florida Peninsula, the central Gulf States, the middle Mississippi Valley, and locally in the northern Great Plains Region. The month closed with rain in portions of the Gulf States and also in the lower Lakes Region and with snow in northern Michigan.

For April as a whole precipitation was heavy to excessive in much of the South Atlantic and Gulf States, and the central and southern portions of the Mississippi Valley, while in most other sections east of the Rocky Mountains it was generally near the normal, except in the southern Plains States, where the fall was as a rule below the seasonal average. In the Rocky Mountains Region and westward the precipitation was generally considerably below the normal, with little or no rain in extreme southwestern Texas and the southern portions of California, Arizona, and New Mexico.

#### RELATIVE HUMIDITY.

In general the relative humidity conformed to the temperature conditions, and there was a very general increase above the normal in the regions with negative temperature departures. The excess was particularly marked over the southeastern States and in the central Plains Region. From the Dakotas and Nebraska eastward the relative humidity was generally below the normal, and a well-marked deficiency was also observed over the Pacific Coast States.

#### GENERAL SUMMARY.

Farm work made good progress during the first decade but throughout the remainder of the month was somewhat retarded by frequent rains in most central and eastern districts. The weather of this April was generally too cold and wet for satisfactory progress of corn and cotton, and in a few sections these crops were considerably damaged. On the other hand, cool and moist weather favored winter wheat, and that crop made excellent progress almost everywhere. Other grain crops were likewise benefited. Some early truck crops were damaged in exposed sections by the low temperature, yet as a whole they made good progress during the month.

Meadows and pastures progressed favorably except in the far Southwest, where damage resulted from lack of moisture. Live stock was generally in good condition, although some losses of unprotected young stock occurred in the northern Rocky Mountains district.<sup>1</sup> Frosts and low temperature injured early fruits in portions of the southern Appalachian Region, the Ohio and lower Missouri Valleys, and in the Rocky Mountain and Pacific Coast States, and peaches were found to be badly winter-killed from the central Mississippi Valley northeastward. However, as a whole, the general outlook for fruit at the end of the month was good.

#### Average accumulated departures for April, 1918.

Districts.	Temperature.			Precipitation.			Cloudiness.		Relative humidity.	
	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure from the normal.	General mean for the current month.	Departure from the normal.
New England.....	44.2	+0.6	-2.8	2.97	0.00	-3.40	5.4	-0.2	73	-2
Middle Atlantic.....	50.6	-0.1	-2.7	4.63	+1.60	-0.50	6.5	+1.2	72	+4
South Atlantic.....	60.5	-0.8	+2.3	5.35	+1.90	-4.20	6.1	+1.9	77	+6
Florida Peninsula.....	73.8	+0.2	+4.3	3.05	+1.10	-2.20	3.4	-0.3	73	-1
East Gulf.....	62.7	-2.0	+3.8	8.32	+4.20	-2.00	6.4	+1.4	76	+4
West Gulf.....	64.4	-1.4	-1.0	5.89	+2.40	-2.30	5.3	+0.2	72	-1
Ohio Valley and Tennessee.....	52.6	-2.0	-5.4	4.15	+0.60	-2.20	7.0	+1.6	70	+4
Lower Lakes.....	44.6	-0.5	-6.7	2.25	-0.10	-0.40	6.1	+0.3	68	-3
Upper Lakes.....	39.9	-1.1	-6.9	2.21	-0.20	0.00	5.2	-0.5	60	-2
North Dakota.....	42.2	+1.5	+16.6	2.49	+0.60	-0.20	5.0	-0.2	63	-4
Upper Mississippi Valley.....	46.4	-4.1	-3.8	3.17	+0.20	-2.00	5.7	+0.4	67	-1
Missouri Valley.....	47.0	-3.4	+2.7	2.90	0.00	-1.00	5.5	+0.2	62	-2
Northern slope.....	39.7	-3.1	+4.2	1.86	+0.30	+0.10	6.4	+1.3	66	+6
Middle slope.....	48.4	-5.3	-0.9	3.50	+0.30	+0.40	5.6	+0.9	64	+6
Southern slope.....	61.5	-0.9	+5.1	0.55	-0.10	-1.30	3.8	-0.6	45	-6
Southern Plateau.....	60.5	-0.5	+1.4	0.13	-0.20	0.00	2.4	-0.4	34	0
Middle Plateau.....	46.8	-2.1	+1.2	0.34	-0.80	-0.60	3.9	-0.2	46	-2
Northern Plateau.....	48.4	-0.6	+9.3	0.50	-0.80	-1.10	4.5	-0.8	49	-1
North Pacific.....	49.9	+0.8	+5.7	1.20	-2.10	0.00	4.8	-1.4	72	-4
Middle Pacific.....	55.3	+1.7	+3.4	0.83	-1.20	-4.90	2.7	-1.5	62	-8
South Pacific.....	60.5	+2.4	+7.7	0.05	-1.00	+2.90	3.5	-0.3	63	-6

#### WEATHER CONDITIONS OVER THE NORTH ATLANTIC OCEAN DURING APRIL, 1917.

The data presented are for April, 1917, and comparison and study of the same should be in connection with those appearing in the REVIEW for that month.

Chart IX (XLVI—39) shows for April, 1917, the principal storm tracks and the averages of pressure, air temperature, water surface temperature, and prevailing direction of the wind at 7 a. m. 75th meridian time (Greenwich mean noon). Notes on the locations and courses of the more severe storms of the month are included in the following general summary.

#### PRESSURE.

The distribution of the average pressure for the month as shown on Chart IX, differed from the normal in several respects. The Atlantic HIGH was about 15 degrees north of its usual position, as the crest of 30.1 inches was near latitude 49°, longitude 21°. A LOW of 29.65 inches was in the vicinity of the Scandinavian Peninsula and a second area of low pressure of less intensity was central near latitude 42°, longitude 47°. The pressure changes from day to day were quite marked in the northern waters, and the means for the three decades of the month differed considerably in some localities, as shown in the following table. This table gives for a number of selected 5-degree squares the mean pressure for each of the three decades of the month, as well as the highest and lowest individual readings reported within the respective squares.

<sup>1</sup> Compare report on stock-warnings by San Francisco forecast district, above, p. 184.

Pressure over the North Atlantic ocean during April, 1917, by 5-degree squares.

Position of 5-degree squares.		Decade means.			Extremes.			
Latitude.	Longitude.	I	II	III	Highest.		Lowest.	
					Pressure.	Date.	Pressure.	Date.
		Inches.	Inches.	Inches.	Inches.	April.	Inches.	April.
60-65 N	20-25 W	29.86	29.94	30.06	30.43	24	29.55	8
60-65 N	5-10 W	29.62	29.70	30.04	30.42	25	29.20	9
60-65 N	5-10 E	29.50	29.55	29.99	30.32	22, 25	29.00	9
55-60 N	35-40 W	29.99	30.08	30.06	30.37	26	29.64	31
55-60 N	0-5 E	29.64	29.64	30.14	30.49	23	29.20	9
50-55 N	55-60 W	29.88	29.91	29.94	30.25	3	29.48	8
50-55 N	25-30 W	29.99	30.23	30.19	30.41	26	29.84	5
50-55 N	5-10 W	29.68	29.93	30.38	30.60	25	29.40	2
45-50 N	65-70 W	29.87	29.90	30.03	30.25	26	29.20	10
45-60 N	35-40 W	29.84	30.15	29.94	30.38	16	29.63	9
45-50 N	15-20 W	30.00	30.21	30.26	30.41	17	29.86	2, 3
40-45 N	55-60 W	29.73	29.84	29.86	30.21	22	29.48	8
40-45 N	40-45 W	29.69	29.98	29.76	30.22	16	29.43	3, 5
40-45 N	25-30 W	29.93	30.27	29.93	30.45	16	29.77	5
40-45 N	5-10 W	29.95	30.13	30.08	30.41	17	29.00	2
35-40 N	65-70 W	29.84	29.96	30.03	30.31	18	29.49	9
35-40 N	15-20 W	30.02	30.21	30.01	30.46	17	29.90	1, 2
30-35 N	75-80 W	30.04	30.06	30.01	30.39	4	29.63	14
30-35 N	60-65 W	29.80	29.98	29.94	30.21	22	29.63	8
30-35 N	30-35 W	29.89	30.11	29.87	30.37	16	29.70	27
25-30 N	60-65 W	30.04	30.04	30.00	30.32	1	29.75	7
25-30 N	20-25 W	29.98	30.09	29.95	30.33	16	29.80	28
20-25 N	45-50 W	30.00	30.02	29.95	30.18	18	29.88	24
15-20 N	75-80 W	29.99	29.94	29.95	30.03	3, 5	29.84	24
15-20 N	30-35 W	29.99	30.03	29.94	30.10	18	29.85	24

The means and extreme values presented in the above table are based on the interpolated daily pressures for each square on the MS. daily synoptic charts of the North Atlantic Ocean compiled by the Marine Section of the Weather Bureau.

#### GALES.

The days on which gales occurred during the month was considerably less than usual, except over a small territory between the Azores and the Bermudas where the number was slightly above the normal.

From April 2 to 6, 1917, a fairly well developed area of low pressure covered the region between the 35th and 45th parallels and the 35th and 50th meridians. The movement of this low was slight and irregular, and it reached its maximum intensity in the 4th, when wind velocities of 75 miles an hour were recorded near latitude 35°, longitude 40°. On the 6th there was a second low central near New York City, and while no heavy winds were reported between that point and Cape Hatteras, moderate gales occurred along the coast south of the 33d parallel. This disturbance drifted slowly eastward, and on the 8th the center was near latitude 42°, longitude 51° and moderate gales still prevailed over a limited area between the 50th meridian and the American coast. On the evening of the 6th a low (*I* on Chart IX) was central near Amarillo, Tex., and by the evening of the 8th it had reached a point near Cape Hatteras. It then curved slightly toward the northeast, and on the morning of the 9th the center was near latitude 38°, longitude 69°. Southerly gales of from 40 to 50 miles an hour prevailed in the eastern quadrants, and northerly winds of about the same velocity were reported along the American coast between New York and Charleston, S. C.

On the 9th another disturbance was in the vicinity of the Scandinavian Peninsula, and northerly gales of 75 miles an hour accompanied by snow were encountered near the Faroe Islands, while off the Irish coast northwesterly winds of somewhat less force were also

reported. On the 10th low *I* was central near Chatham, N. B., where the barometer reading was 29.08 inches, and westerly to northwesterly gales, with snow, prevailed over a limited area between the 40th and 45th parallels. The Scandinavian low remained practically stationary during the next 24 hours but decreasing in intensity, as on the 10th no winds of over 40 miles an hour were reported east of the 60th meridian. From the 11th to the 20th an area of low pressure remained between the 40th and 50th parallels and the 45th and 60th meridians; this moved slightly back and forth, increasing and decreasing in intensity from day to day, and on the 11th northwesterly gales of 40 miles an hour were recorded by vessels between the 68th meridian and the American coast.

From the 12th to the 20th a low of moderate intensity remained in the region between the American coast and the 40th meridian and the 40th and 55th parallels. During this period reports of moderate gales were received from widely scattered points west of the 35th meridian, while over the remainder of the ocean the conditions were comparatively featureless with sluggish atmospheric circulation. This area of low pressure drifted slowly eastward, increasing in extent and decreasing in intensity, until on the 21st it was central near latitude 50°, longitude 35°. It then gradually filled in and from the 22d to the 27th there were no disturbances of any consequence recorded, while light to moderate winds prevailed over the entire ocean.

From the 28th to the 30th there was a fairly well developed low in the region between the 38th and the 45th parallels and the 45th and 57th meridians; it moved but slightly during that period, and moderate gales were encountered in its western quadrants.

#### AIR TEMPERATURES.

The mean monthly temperature of the air, as compared with the normal, differed considerably over the different divisions of the North Atlantic. In the waters adjacent to the European coast and north of the 45th parallel, and west of the 30th meridian, positive departures of from 2° to 5° were the rule, while between the 25th and 45th parallels the temperatures varied but little from the normal, being slightly above in the north and below in the south. South of the 25th parallel the departures ranged from 0° between the 15th and 25th meridians to -4° in the southern part of the Gulf of Mexico.

The seasonal rise in temperature was quite marked in northern waters, and the daily fluctuations were also comparatively large; the greatest range occurred in the square between latitude 50°-55°, longitude 50°-55°, where the thermometer read 29° F. on the 4th and 10th, and 47° F. on the 13th.

The following table gives the temperature departures for the month at a number of Canadian and United States Weather Bureau stations on the Atlantic and Gulf coasts.

	° F.		° F.
St. Johns, N. F.	+3.0	Norfolk, Va.	+1.6
Sydney, C. B. I.	+3.0	Hatteras, N. C.	+1.2
Halifax, N. S.	+2.9	Charleston, S. C.	+3.4
Eastport, Me.	-0.2	Key West, Fla.	-0.6
Portland, Me.	-2.8	Tampa, Fla.	+1.0
Boston, Mass.	-1.3	Mobile, Ala.	+0.6
Nantucket, Mass.	-2.6	New Orleans, La.	+0.3
Block Island, R. I.	-1.8	Galveston, Tex.	-0.9
New York, N. Y.	-0.9	Corpus Christi, Tex.	-0.1

## WATER SURFACE TEMPERATURE.

The mean monthly surface water temperature as compared with the normal, were about as variable as those of the air, especially north of the 40th parallel, and west of the 50th meridian. In the vicinity of the "cold wall," or where the Labrador current and the Gulf Stream meet and where the daily fluctuations are usually large, the mean water temperature for the month was somewhat above the normal. In the waters adjacent to the American coast the conditions were reversed, the negative departures gradually decreasing from Halifax toward the Virginia Capes. In the waters adjacent to the European coast and in the vicinity of the Madeira Islands the temperatures were 1 to 3° higher than usual, while in mid-ocean south of the 30th parallel they were nearly normal.

## FOG.

The number of days with fog is usually somewhat larger in April than in March. Off the Banks of Newfoundland, however, where the maximum amount usually occurs, fog was reported during April, 1917, on 2 days only, while the average percentage for that locality is from 35 to 40.

Off the shoals of Nantucket and along the New England coast fog was reported on 4 days, which is only slightly below the normal, while in the steamer lanes it was comparatively rare. Fog was observed on 3 days in the vicinity of the Azores, and on 1 day off the Virginia coast.

## HAIL AND SNOW.

The amount of hail and snow was, as usual, less in April than in the previous month. During the month

under discussion both hail and snow were observed on 3 days over the eastern part of the steamer lanes where the maximum amount occurred. They were not reported on more than 1 day in any 5° square west of the 20th meridian.

*Winds of 50 mis./hr. (22.4 m./sec.) or over, during April, 1918.*

Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.
		<i>Mis./hr.</i>				<i>Mis./hr.</i>	
Bismarck, N. Dak.	16	52	w.	Nantucket, Mass.	12	58	ne.
Block Island, R. I.	11	56	ne.	New York, N. Y.	22	52	nw.
Do.	12	50	ne.	Do.	23	50	nw.
Buffalo, N. Y.	18	50	sw.	North Head, Wash.	1	52	nw.
Do.	22	53	sw.	Do.	8	56	se.
Canton, Ohio.	18	52	e.	Do.	13	56	se.
Corpus Christi, Tex.	29	64	n.	Do.	14	60	se.
Devils Lake, N. Dak.	28	50	n.	Pensacola, Fla.	7	65	s.
Drexel, Nebr.	28	50	w.	Pierre, S. Dak.	28	53	nw.
Evansville, Ind.	1	51	sw.	Point Reyes Light, Cal.	1	78	nw.
Fort Smith, Ark.	16	58	w.	Do.	2	70	nw.
Hatteras, N. C.	26	62	e.	Do.	10	62	nw.
Do.	27	54	n.	Do.	11	61	nw.
Little Rock, Ark.	16	52	w.	Do.	12	67	nw.
Jacksonville, Fla.	4	58	w.	Do.	13	62	nw.
Kansas City, Mo.	15	55	e.	Do.	14	70	nw.
Memphis, Tenn.	3	50	nw.	Do.	15	66	nw.
Do.	17	52	nw.	Do.	23	50	nw.
Do.	27	52	sw.	Do.	30	54	nw.
Mobile, Ala.	7	58	sw.	Port Arthur, Tex.	5	55	w.
Modena, Utah	2	58	s.	Providence, R. I.	24	58	w.
Mt. Tamalpais, Cal.	2	62	w.	Sandy Hook, N. J.	10	55	ne.
Do.	9	50	nw.	Do.	11	56	ne.
Do.	12	72	nw.	Do.	12	53	ne.
Do.	13	72	nw.	Sioux City, Iowa.	28	52	w.
Do.	14	74	nw.	Do.	29	59	nw.
Do.	18	56	ne.	Tatoosh I., Wash.	8	50	s.
Do.	19	62	nw.	Toledo, Ohio.	17	50	sw.
Do.	20	56	nw.	Do.	29	53	sw.
Do.	28	56	nw.	Wilmington, N. C.	26	60	ne.
Nantucket, Mass.	11	54	ne.				